

# The Fusion and coexistence of Diverse Aesthetics — The Research on the New Aesthetic Features of American Sci-Fi Architecture Designed with Digital Technology

Zhi Li<sup>1</sup>, Yuan Li\*

<sup>1</sup>School of Animation and Digital Arts, Communication University of China, China

\* Architectural Engineering Department, Planning and Design institute of Forest Products Industry, China

\*Corresponding author, e-mail: 616180769@qq.com

**Abstract:** Digital technology intervenes in sci-fi films, influencing the aesthetic expression of architectural scenes. Digital sci-fi architecture presents new aesthetic characteristics of the fusion and coexistence of various aesthetics: artificial general intelligence and flexible intelligent technology update sci-fi architecture, resulting in the mutual integration and symbiosis of rigid machine beauty and life aura beauty; minimalist architectural spaces and complex architectural structures produce the interpenetration of minimalist aesthetics and complex aesthetics; digital simulacra and digital virtual space the infiltration and flow of to the real space permeate and flow into the real space, resulting in the interplay of gorgeous optoelectronic beauty and spatially nested psychedelic beauty in the architectural spaces.

**Keywords:** sci-fi architecture, aesthetic features, American sci-fi films, digital technology

## 1. Introduction

Digital technology has been involved in the design of architectural scenes in American sci-fi films. This has not only renewed the form of sci-fi architecture and greatly expanded the freedom of its visual 'fictionality', but has also had significant impact on the aesthetic style of sci-fi architectural scenes. The digital sci-fi architectural scenes are characterised by a new aesthetic coexistence of multiple aesthetic styles.

## 2. The symbiosis between the machine beauty of artificial general intelligence and the life-aura beauty of flexible technology

In terms of formal design, sci-fi architecture as a whole exhibit machine aesthetic. Machine aesthetic was one of the key aesthetic styles of the early 20th century, and is also the core aesthetic style of the sci-fi architectural scenes. This stems from the symbolic role of machines for technology: machines have always been synonymous with modern technology.

On the one hand, as human society entered industrial society, designers saw the rapid development of technology and gave great recognition to technological creations and methods of creation. They then promoted and passed on their admiration for technological creation methods and technological products. The machine and its inner core - the invention of man using technological means - reinforced the strong link between machine and science fiction. The machine aesthetic is one of the biggest differences in art style between sci-fi architectural scenes and other fantasy film scenes such as magic. In science fiction, the scientific, technological nature (of the imagination) requires that sci-fi buildings be spaces constructed using high-tech materials, a field occupied by machines. Mechanisation and automation were once the artistic language of the 'technological future' landscape. On the other hand, since the beginning of modernism, the human understanding of building space has been connected to the principles of building machines. Mechanised, machine-functional architecture became a certain pursuit of modern, technological architecture. Le Corbusier, one of the founders of machine aesthetics, said that 'the house is alive machine', making clear that the link between machine and architecture is that architecture, whether machine like or not, should serve people and improve life like a machine. The direct source of inspiration for the machine aesthetic style of sci-fi architecture is the British high-tech architecture: the building as a whole resembles a massive machine, emphasising the formal beauty of the combination of mechanical materials and components without hiding structures and connections. High-tech architecture put Le Corbusier's declaration that 'the house is alive machine'" into a formal, visual form. In Star Wars, the transformed city of the shipbuilding planet Corellia's power yard is made up of a cluster of steampunk-style buildings. The buildings in the yard are wrapped in a hodgepodge of pipes, steel frames and huge chimneys. The density of the buildings follows the principle of complexity, with a variety of interwoven and entwined structures that create a visual landscape of large, broken, intersecting blocks (fig.1).



*Figure 1 Corellia's power yard in Star Wars*

As the concept of science and technology changes, the aesthetic meaning of sci-fi architecture is gradually transformed from a rigid mechanical beauty to a artificial general intelligent beauty. Science fiction and contemporary society are closely intertextual, and the changing technological and spatial perceptions of reality influence the inner meaning and form of sci-fi architecture. The aesthetics of machines contained in digital sci-fi architecture follows the changing aesthetics of machines in the real world. IN *Theory and Design in the First Machine Age*, Reyner Banham figured out that<sup>[1]</sup>: The mechanical age has almost undergone at least three transformations. The first mechanical age began with the Industrial Revolution in the 18th century, when the mechanical content included Victorian steam engines, steel, cast iron and smoke; the second mechanical age saw the mechanical content change into sophisticated, detailed, clean and technologically-inspired electrical machines; the third mechanical age began with the Third Industrial Revolution in the 1940s, when the mechanical content evolved into transistorised, electronic, television-mediated and electronic devices, as well as rocket engines and space travel, among other innovations involving intelligent technology. In contemporary times, the mechanical content has expanded more into elements of intelligence, the Internet of Things and genetic bioengineering. In 21st century digital sci-fi films, highly intelligent sci-fi building spaces are equipped with highly intelligent AI-controlled systems that support the coexistence of multiple interactive interfaces and linking technology to the space as a whole. In sci-fi film *Iron Man*, Stark's company and mansion are all connected by strongly intelligent systems, which Stark can use to automatically calculate by voice instructions to build houses, repair armour, update technology and even find the correct time difference between quantum space and real space in order to travel into the future, or back in time (Figure 2).



Figure 2 Spatial UI system in the interior of the Stark mansion

In addition, with the rise of emotional design and a focus on the valuing of organic life, American sci-fi films have created sci-fi eco-architecture. Eco-buildings are based on intelligent technology, with spaces equipped with emotional interaction systems. Like a living being, the building is able to automatically adjust its spatial environment by receiving human emotions. Through the 'softening of shapes', the sci-fi eco-Architecture is a 'softening of form' to reveal a human-computer harmony, a human-computer intimacy, and an aura technological beauty that seems to be alive.

On the one hand, the 'softening of form' in sci-fi architecture is expressed in the curved forms of the buildings, the bionic structures. Both represent organicity and flowability. On the other hand, the 'softening of form' is also represented by intelligent systems that dynamically adjust the appearance of the building. The sci-fi architecture shows its adaptability to the environment and the building's

'living' nature through its adjustable architectural appearance. The intelligence of sci-fi architecture, the adaptability of the building skin, and the deformability of the building form all demonstrate the idea that sci-fi architecture pursues an 'organic connection' to the philosophy of life, stating a vision of the future of the world. In films such as Avatar and The Avengers, sci-fi architecture and people are organically coexisting, with architectural spaces communicating and harmonising with people, and the buildings displaying a design vision towards organic organization.

### 3. The coexistence of the minimalist beauty of the architectural space and the complex state of the building structure

In sci-fi films, digital sci-fi architecture shows a new coexistence of minimalist and complex beauty. Minimalist beauty consists of minimalist architecture without any decoration and a spatial style with the minimalist design concept, surface texture and interaction design of Apple products. Complexity is expressed in the complex structure of the building, presenting the complex beauty . Complexity in sci-fi architecture is part of the aesthetic properties of the complexity of sci-fi cities and reflects the influence of Complexity Science on sci-fi architecture.

#### (1)The minimalist space aesthetics of sci-fi architecture

Minimalism is considered to be one of the original futuristic features of sci-fi cinema. As early as in the sci-fi film *Things to Come* (1936), William Cameron Menzies used a minimalist, pure white style to create a technologically advanced underground future city. On the one hand, the minimalist style embodies the future-oriented vanguard represented by modernism: the creation of open architectural spaces in which function determines form<sup>[2]</sup>. Minimalism, order, regularity, purity and solemnity are the hallmarks of the technological future. On the one hand, the minimalist style embodies the future-oriented vanguard represented by modernism: the creation of open architectural spaces in which function determines form . Minimalism, order, regularity, purity and solemnity are the hallmarks of the technological future. Both Minimalist building blocks and internal spaces renounce of unnecessary curves and folds, and the arrange components in a functional way to achieve a clean and orderly aesthetic. The minimalist architectural space embodies the sacredness of technology and is a symbol of technological optimism (Fig. 3). On the other hand, the 'monist', 'rationalist' connotations of the minimalist style have led to the emergence of minimalist sci-fi architecture in highly centralised, politically/economically oppressive and terrifying futures. Monism assumes that the nature of the world can be reduced by breaking it down into a few basic elements. Minimalism tends to treat buildings as cold machines in a rationalistic way, with synthetic materials such as concrete, glass and stainless steel materials expressing minimalism and seeking the beauty of order present in the structure. Minimalist architecture often ignores human feelings and rejects natural materials such as wood and fabric in an attempt to remove both the vitality and the naturalness from them. As a result, the rationalism of minimalism, if taken to its extreme, creates a highly mechanised and ordered, dehumanised and monitored anti-utopian future. For instance: in *Blade Runner: 2049*, the architecture is seen from the outside of the building space with its minimalist shapes of interspersed blocks and brutalist rough surface textures, revealing the depressed, condensed temporal atmosphere of Blade Runner: 2049 (Fig.3).



Figure 3 *Things to Come* (1936), *Blade Runner: 2049*(2017)

The sci-fi Building surface texture and interior style also integrate the aesthetics of minimalist industrial products, particularly Apple electronics. The smooth finishes and minimalist design ideas created by Apple products are a hallmark of intelligent products of the human electronic age and a revolution of the high-tech mechanical aesthetic that favours structure and the exclusion of components. As in the sci-fi animation *Wall-E*, Ava's streamlined and minimalist style of the new generation of machines demonstrates the perception that "sleek and minimalist design is a technological aesthetic that is evolving towards the future" .. In *I, Robot*, the look of the Robot is also inspired by Robot 1st-generation computer with the clear crystal coffin style (Fig. 5)

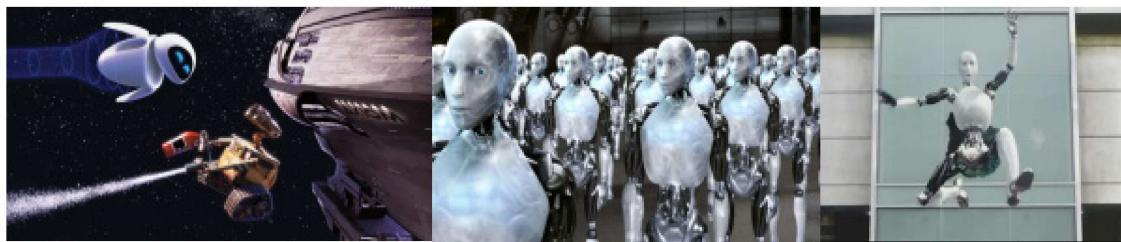


Figure 5 *Wall and Eva* in *Wall-E*, Robot's apple clear crystal coffin style in *I, Robot*

Behind the minimalist design of Apple products lies a remarkable ability to handle large amounts of information, a high level of industrial manufacturing excellence and a keen desire for human-machine harmony. Apple's core design philosophy (Simplicity is the ultimate sophistication)<sup>[3]</sup> encompasses the philosophy of sifting and distilling complexity, unifying it and presenting it to the user in the simplest way possible. The design of "streamlined lines", "monochrome", "smooth plastic and metal", "electronic surface treatment "and "regular straight lines and bevels" are the ultimate expression of electronic technology's quest for simplicity. The design of "streamlined lines", "monochrome", "smooth plastic and metal", "electronic surface treatment "and "regular straight lines and bevels" are the ultimate expression of electronic technology's quest for simplicity. In the sci-fi film *Oblivion*, the high altitude post building itself looks like a huge, minimalist industrial product. In *Minority Report*, sci-fi buildings have magnetic levitation systems attached to their surface, and white exteriors and airy interior are minimalist in their circulation and pure white aesthetic (Fig. 6).



Figure 6 the high altitude post building in *Oblivion*, sci-fi buildings in *Minority Report*

## (2) The aesthetics of complexity in sci-fi architectural structures

In contrast to the minimalist style, another prominent feature of digital sci-fi architecture is an aesthetic of complexity that displays elaborate structures. Complexity is one of the aesthetic properties of the digital design of sci-fi cities. Aesthetic properties refer to the unique nature, character, etc. inherent in aesthetic expression. Sci-fi cities are complex. Sci-fi cities contain complex physical landscapes and complex abstract (Civilized /social-relations) landscapes<sup>[4]</sup>. And sci-fi architecture is the epitome of these complexified physical and mental landscape. In addition, the complexity science that emerged in the 1990s has also influenced the expression of complexity in sci-fi architecture. Complexity science identifies 'complexity' as one of the essential properties of the cosmic world, of life itself. It is in line with postmodernist and deconstructionist ideas such as decentralisation, de-hierarchisation and the blurring of boundaries. In *Complexity and Contradiction in Architecture*, Robert Venturi argued that architecture will take on the task of expressing the complexity of life. Whether it is done with collage, deconstruction, or in a dramatic way<sup>[5]</sup>, it aims to express the nature of a complex, multifaceted and contradictory world.

Digital technology has exacerbated the complexity of sci-fi architectural structures. Architectural spaces are reshaped by a variety of high-tech, estranged and complex structures, displaying a dazzling and complex aesthetic. Digital technology enables the creation of multiple architectural structures, spaces built from materials interwoven with complex structures. Repetitive functional structures further create a complex architectural texture; the interior of the building is built from repetitive structures, such as the spatial mesh of large free-form domes, and windows and doors covered with intricately textured corbels. As in Star Trek, the vast design of the Iowa space station, the Enterprise, and the interior spaces, including the zonal speed engine bay, showcase the large architectural volumes and the complex structures that fill the screens on/in the building (Figure 7). Predictably, digital technology creates architectural ruins and building wrecks with a more complex exposed structure. The films show the complex aesthetics and grotesque beauty of sci-fi complexes through collapsed steel frames, scattered bricks and sprawling structures, as well as the complex interlocking relationships of collapse<sup>[6]</sup>. Such as sci-fi film 2012, Ready Player One(Figure 7).



*Figure 7 Iowa space station, the interior spaces of the Enterprise, and in star trek, digital architectural ruins and building wrecks in 2012 and Ready Player One*

In fact, the complex structure embodies the technical and material beauty that is typical of architecture in the digital age. Many of the complex structures are computer-parameterised. The computer helps to iterate and fractalise the various truss structures, using a hierarchical structure to reduce the weight of the material and to strengthen its resilience and load-bearing capacity. The iterated structures also add texture to the surface of the building, Such as spiral self-similar structures in large spatial dimensions and nanomaterials "Trusswork" etc.<sup>[7]</sup>(Fig.9)

The sci-fi films use minimalist architectural spaces and elaborate architectural styles to suggest the contrasting status quo of the urban class: the sleek, airy, minimalist buildings and spaces are the living spaces of the wealthy class, who occupy the majority of society's wealth. And the haphazardly stacked, structurally exposed spaces of dilapidated buildings are a place where the impoverished, low-skilled classes with very few resources to live are left to fend for themselves. The sci-fi films use the alienated landscape of a highly polarised city lacking a middle class to show science fiction's nightmare warning of a low-life future caused by high technology.

#### **4. Coexistence of the splendid beauty of digital simulacra and the fusion of real and virtual states**

In digital sci-films, fully-interfaced, interactive sci-fi architectural spaces are awash with fluid information that is made colourful through digital simulacra. Baudrillard's 'simulacra' and simulacra culture have been one of the most important elements of digital sci-fiarchitectural spaces since Star Wars (1978) provided a holographic projection of Princess Leia. Jean Baudrillard summarises the digital content created by digital technology as simulacra. He argues that the pictorial content of visualised landscapes in contemporary society has shifted from a 'visual' paradigm to a 'simulacra' category[[[ Heidegger. The age of the world image. In Sun Zhouxing. Selected Works of Heidegger [M]. Shanghai: Sanlian Bookstore.1996.]]. The realistic imaginary object 'simulacra' is freed from the concrete, realistic object of imitation. The traditional referents and referents, contents and meanings of things are broken down and deconstructed, reorganised for the purpose of consumption, and thus extensively symbolised. These symbols form anthropomorphic images that Jacques Lacan refers to as 'floating noumena'. Digital anagrams add to the psychedelia of sci-fi architecture through photorealistic effects and electronic neon. At the same time, sci-fi films see the virtual-cyberspace constructed by digital mimesis as one of the key spaces and are dedicated to exploring the entangled relationship between electronic images, virtual space and the future of humanity. Starting with Tron

in 1982, sci-fi films have used computer imagery as a backdrop to narrate sci-fi stories. The digital medium itself creates optoelectronic art, abstract images and cyberspace, all of which add to the spatial dimension of sci-fi exploration<sup>[9]</sup>. *Ready Player One* (2018) brings together video games and sci-fi narratives, with sci-fi architecture becoming one of the visual interfaces between the virtual and real worlds. The film's virtual holospace intertwines with real space, even as virtual space takes on more significance than real space. (Fig. 9).



Figure 9 nanomaterials "Trusswork". holographic projection of Princess Leia in Star War (1978).  
ruin real space in Ready Player One (2018)

Digital sci-fi films are inherently self-referential to digital media art. Digital sci-fi films stretch the forms in which digital technologies appear in real space, the way they occupy space, the role of digital content in cultural life, and the state of coexistence between digital images and reality in exaggerated extremes[[Ren Jun. Looking ahead: 50 years of urban development "chronicles" (2000-2050)[J]. Journal of Tianjin Academy of Fine Arts. 2016,(06):73-82(1)]]. As *The Matrix* demonstrates, deeply immersive cyberspace has been likened to psychedelics. People are like 'Brain in a vat', wandering in a black, low-tech sci-fi parallel world that dissolves the border between the real and the virtual, in the false 'reality' of digital mimesis (Fig. 10).



Figure 10 The "real desert" and the virtual program space in *The Matrix*

## 5. Conclusion

Digital technology is revolutionising the aesthetic expression of sci-fi architecture. Digital sci-fi architecture shows the fusion and coexistence of multiple aesthetic styles, including the symbiosis between the machine beauty of strong intelligence and the aura beauty of flexible technology, the coexistence between the simplicity of smooth surfaces and the complexity of architectural structures, and the coexistence between the splendour of digital simulacra and the fusion of the real and the virtual . Through a variety of aesthetic styles, digital sci-fi architecture helps sci-fi films to showcase

the impact of digital spectacle and maintain the sensory appeal of sci-fi films.

## References

- [1] Chen, A. Y. (2010). Futurism and purism - the origins of European machine aesthetics. *Decoration*, (04): 26-30
- [2] Tim Bergfelder, Sue Harris, Sarah Street .*Film Architecture and the Transnational Imagination: Set Design in 1930s European Cinema*, Amsterdam University Press, 213
- [3] Editorial Board of Decoration. Idea and appearance : minimalist classic design [J]. *Decoration*, 2014(10): 30-39
- [4] Lin, Q. D. (2014). Architectural morphogenesis based on fractal theory. Beijing: Tsinghua University.
- [5] Lu, X. W. A preliminary investigation of the influence of parametric design on architectural form. *Dalian University of Technology*, 16
- [6] Istvan Csicsery-Ronay Jr. (2008). *The Seven Beauties of Science Fiction*. Wesleyan University Press, 38
- [7] Tan Liqin. Singularity art:The metamorphosis of future art under the impact of technological singularity. Beijing:*Machinery Industry Press*, (01): 82
- [8] Heidegger. The age of the world image. In Sun Zhouxing. *Selected Works of Heidegger*. Shanghai: Sanlian Bookstore.1996.
- [9] Judy Duncan, L, X., Li, X. (2011). The War Journal System: Behind the Scenes of the Making of TRON: Legacy. *Film Art*, (02): 146-153..
- [10] Ren, J. (2016). Looking ahead: 50 years of urban development "chronicles" (2000-2050). *Journal of Tianjin Academy of Fine Arts*, (06): 73-82(1)